A Scalable and Secure Peer-to-Peer Information Sharing Tool

Karlo Berket

Abdelilah Essiari

Artur Muratas

Anita Pillai (student)

Goals

- Allow owners of information to control storage, management, and sharing of information

- Faster access to information updates in a collaboration

- Seamless and secure sharing of information between multiple collaborators

- Support for ad hoc collaborations

Novel Ideas

- A peer-to-peer system to support location-independent information sharing in the scientific community
- Use of group communication mechanisms to enable scalable on-demand search in peer-based environments
- Security mechanisms and policies for ad hoc information sharing
  - Secure Group Layer (SGL) for securing group communication
  - Akenti for X.509 identity certificate-based authentication and authorization

Major Accomplishments

- Software Release 0.9.1
  http://www.dsd.lbl.gov/scishare
  - Fully-functional with single interest group
  - Security mechanisms in place
    - Query response and data transfer communicated securely
    - Authorization enforcement for access to metadata and data
- Publication
  PKI-Based Security for Peer-to-Peer Information Sharing, K. Berket, A.Essiari and A. Muratas, to appear in the Proceedings of the Fourth IEEE Internation Conference on Peer-to-Peer Computing, Zurich, Switzerland, Aug. 25-27, 2004. LBNL-54975.

Scishare Architecture

Search query

Search response

Transfer

Interest Group
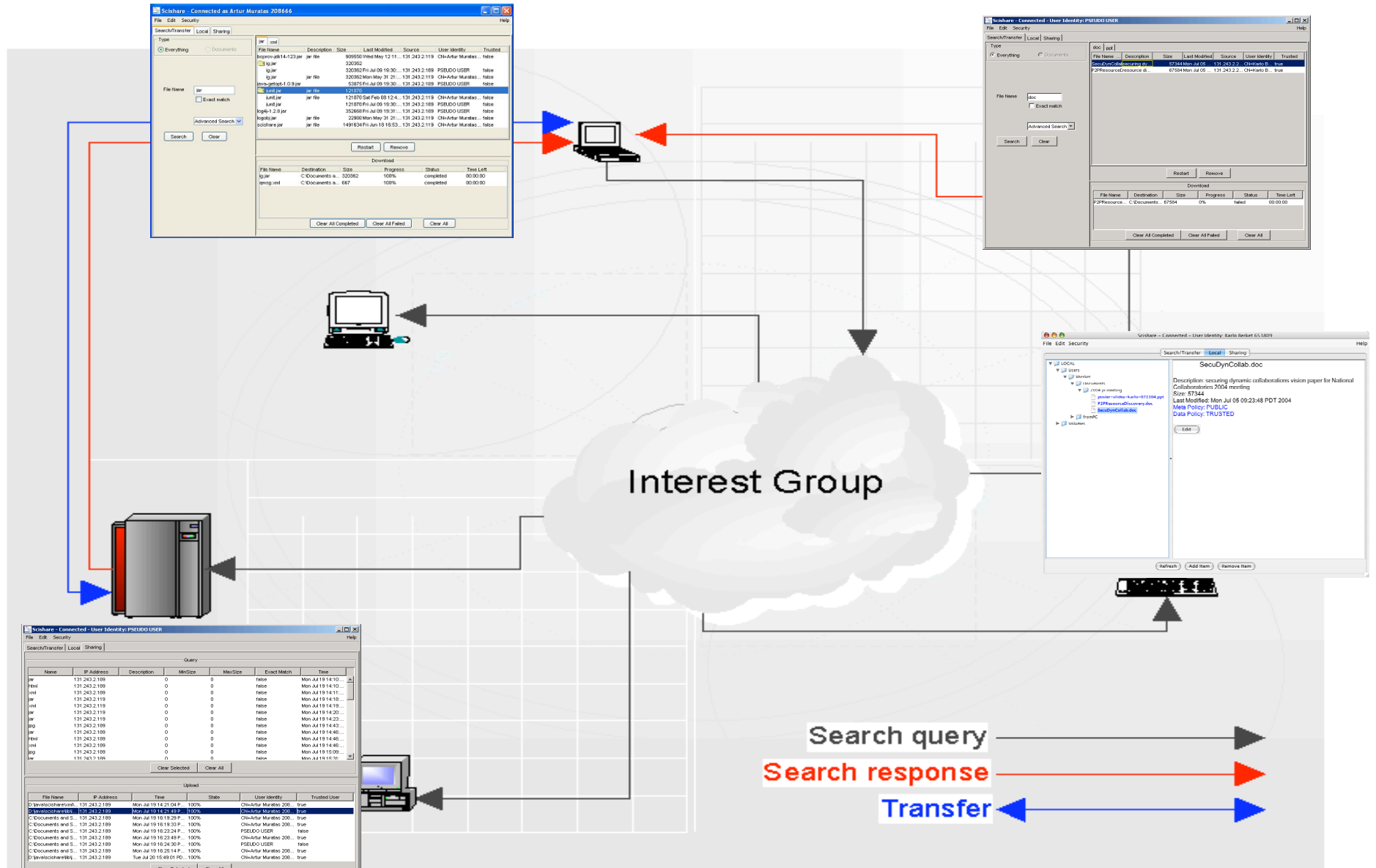
Search - Transfer

- Create basic and advanced queries.

- Start and restart a search.

- Group search results based on the same hash.

- Search results include user identity, the source sending the metadata, and whether or not the user is trusted.

- Start, pause, resume, stop, and restart transfer of a file.

- Allow user to download portions of a file in parallel.

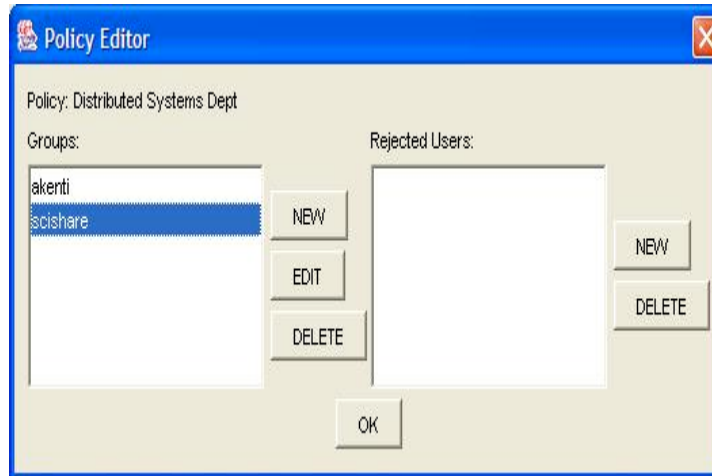- Save the state of search and transfer results.
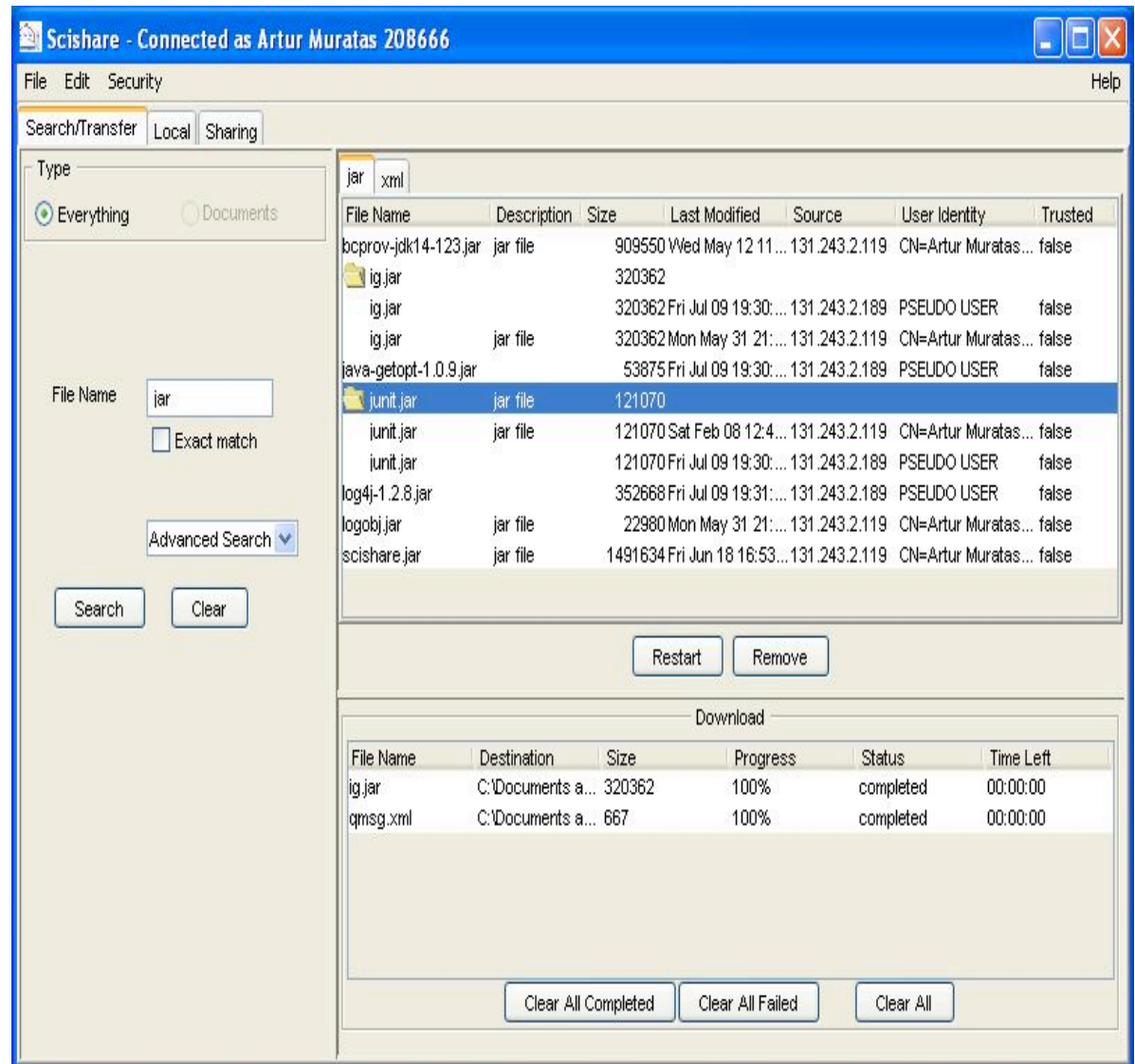
Future Work: Short-Term

- Support for interest groups
- Fully implement security features described in PKI-Based Security for Peer-to-Peer Information Sharing publication
- Continue instrumentation and testing
- Develop user base in scientific community

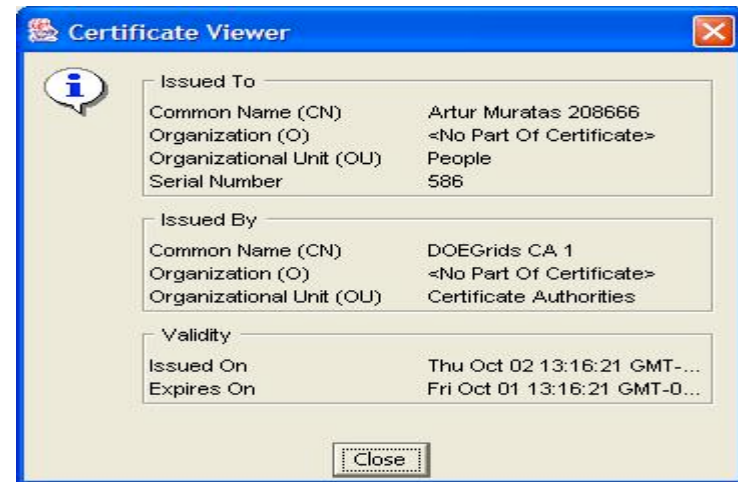# Strong Security- Easy to Use
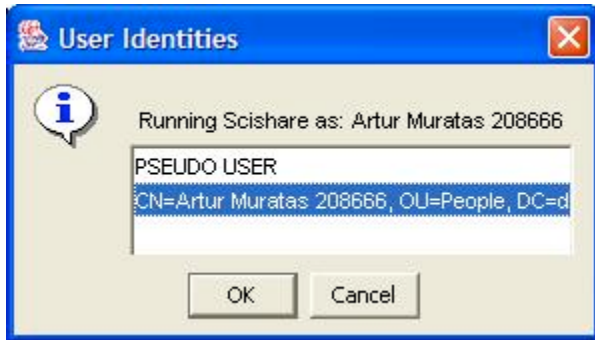
Manage User Identity
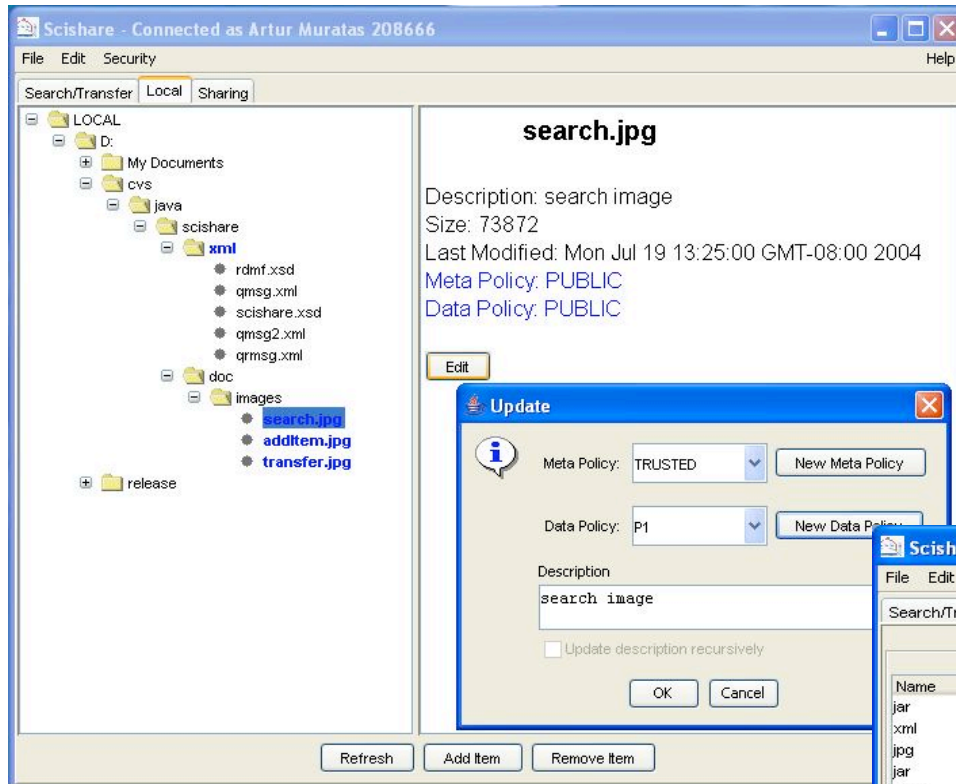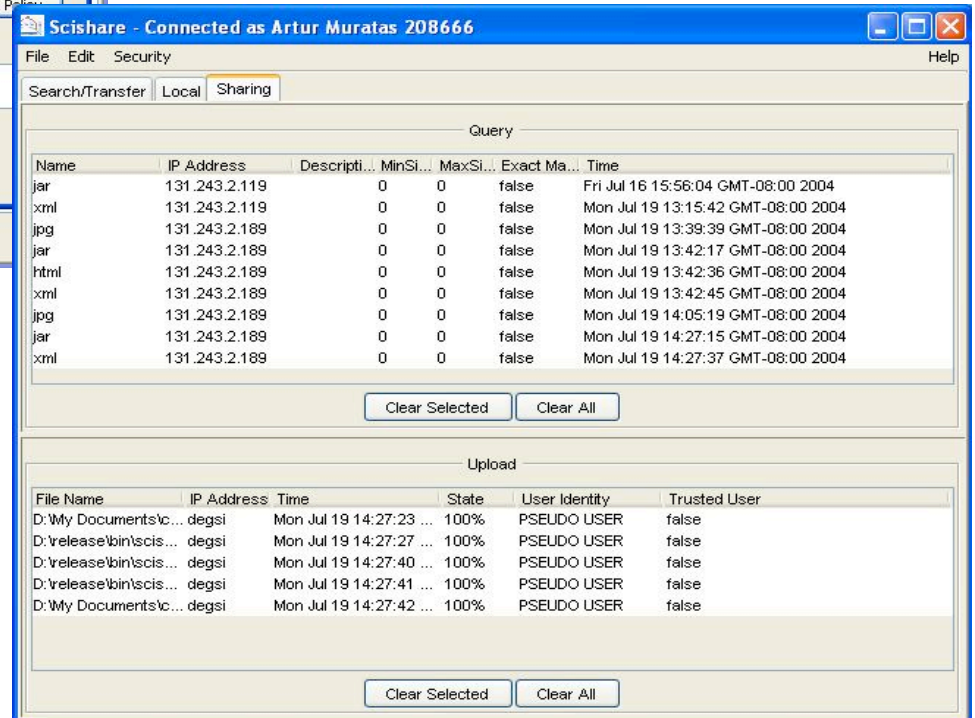
Manage Policies

Manage Groups

Manage CAs

View Untrusted Users

Local - Sharing

- Add, remove, update files in DB
- Synchronize DB with file system
- Map resources with policies to protect metadata and data
- View metadata

- Share metadata
- Share data
- View incoming queries
- View uploads

Future Work: Long-Term

- Integrate general-purpose resource discovery
  - P2PIO/firefish
- Test performance of scishare using native multicast vs. application level multicast
- Added value services
  - Persistent repository
  - Presence information
- Create general framework for securing collaborations based on security implementation in scishare

Connections

- Reliable and Secure Group Communication
- Distributed Security Architectures
- Distributed Monitoring Framework
- Middleware to Support Group to Group Collaboration
- Pervasive Collaborative Computing Environment
- eServices Infrastructure for Collaborative Science

More Information

project home

http://www.dsd.lbl.gov/P2P/file-share

software download

http://www.dsd.lbl.gov/scishare

Contact

project information

kberket@lbl.gov

software specific

scishare@george.lbl.gov